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Nicotine in Blood: Detection by Radioimmunoassay.

The major objective of this project is to develop means of quantifying nicotine and its major metabolites in blood at levels achieved as a consequence of tobacco smoking. In view of the low levels of substances to be measured and the investigators' experience in detecting hormones and drugs, they believe radioimmunoassay is the procedure of choice.

The project covers development of specific antisera against nicotine, cotinine, hydroxycotinine and desmethylcotinine. As antisera become available, protocols will be developed for assaying nicotine and its metabolites using "wet" chemistry techniques. However, standard radioimmunoassay methodology can be simplified and accelerated significantly by converting to "solid-phase." Specifically, as "wet" chemistry protocols are developed and field-tested, the investigators will couple specific antisera to solid supports (e.g., silanized controlled pore glass), and develop and test solid-phase protocols in parallel. Their preliminary experience with solid-phase radioimmunoassays of thyrotropin and progesterone indicate that the time required for a given assay may be reduced seventy-fold.

Little is known of the concentrations of nicotine and its metabolites achieved in blood, other body fluids, and tissues as a consequence of smoking. The investigators believe that modern assay technology can remedy this situation, and they, therefore, propose to develop radioimmunoassays for nicotine, cotinine, hydroxycotinine and desmethylcotinine. Emphasis will be placed on simplicity and rapidity of use as well as on specificity and sensitivity. They then plan to make these assays available to all interested investigators to permit direct re-examination of the actions of nicotine and its metabolites as a function of inhalation of tobacco smoke.

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